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(54) Adjustable headrest arrangement

(57) A headrest 1 is mounted on rods 4, the vertical positions of which are adjustable relative to the frame 3 of a seat back. To avoid otherwise inconvenient manual adjustment of the position of the headrest 1, an electric motor 5 actuates means, such as a winch 16 and return spring 19, as shown, or rack and pinion or nut and screw spindle.

The invention is particularly applicable to seats in vehicles or craft.

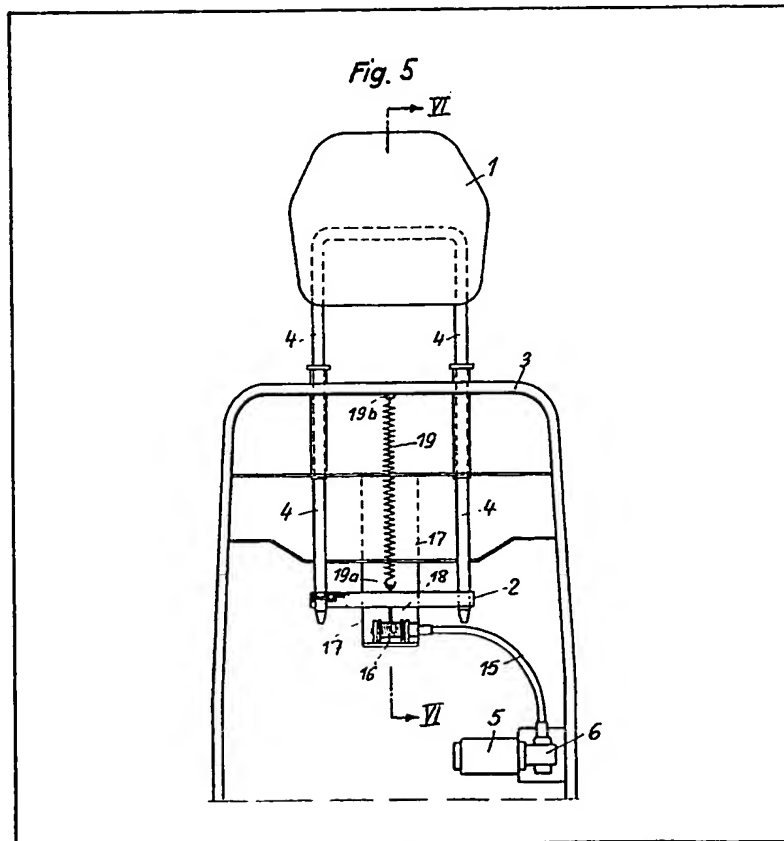


Fig. 1

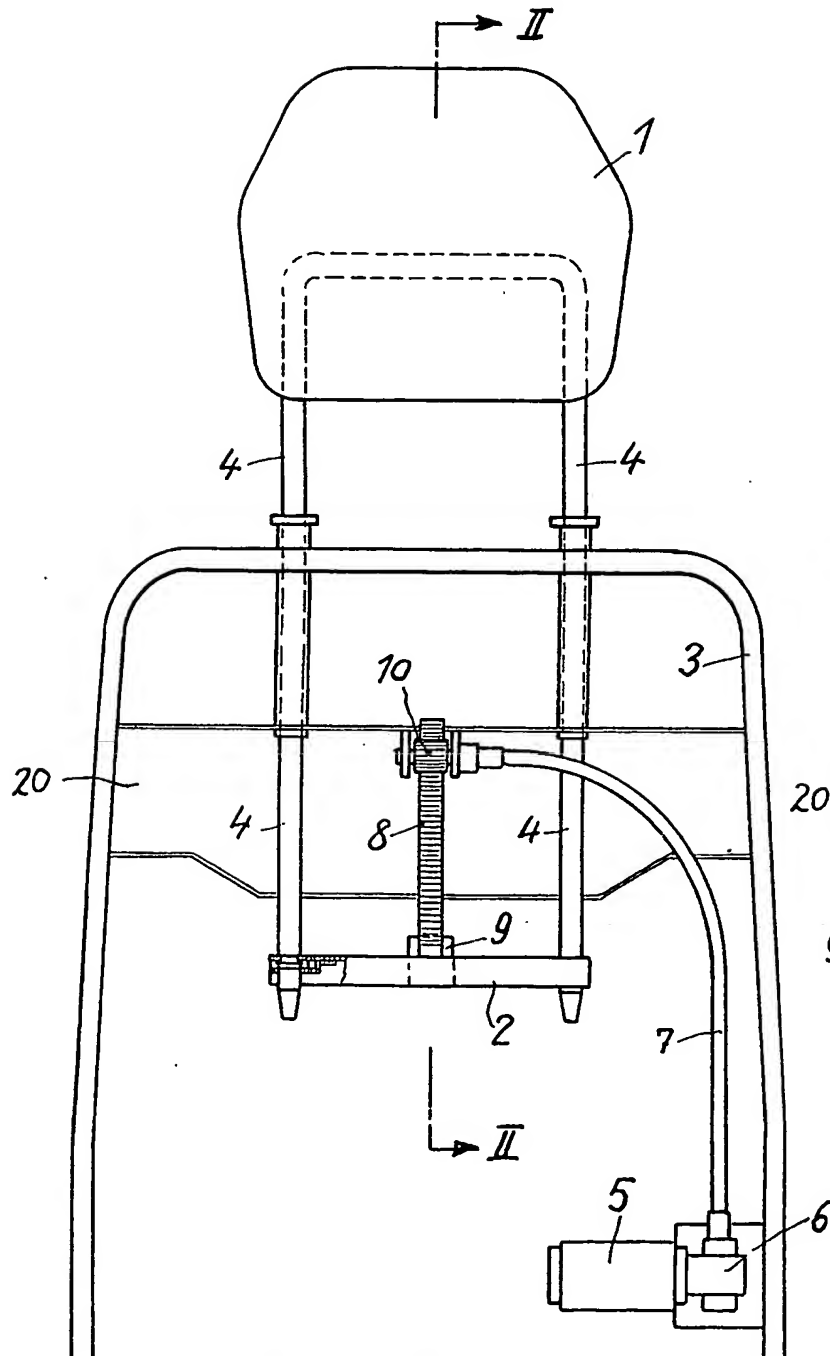


Fig. 2

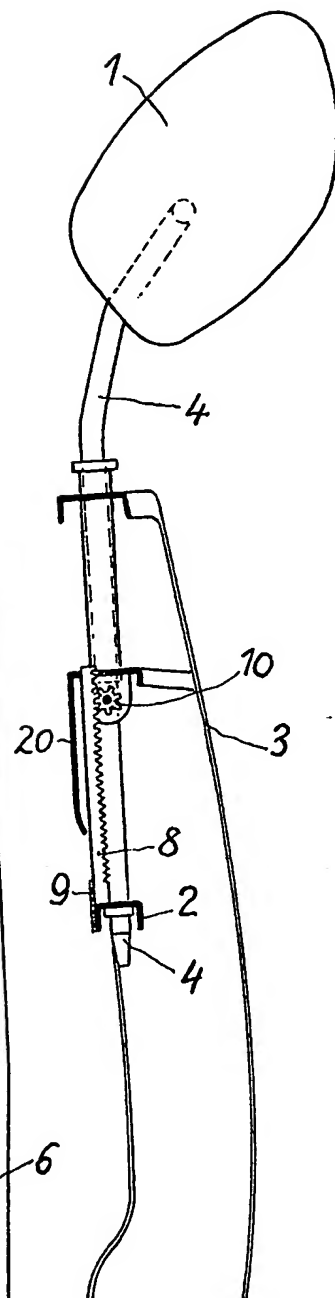


Fig.3

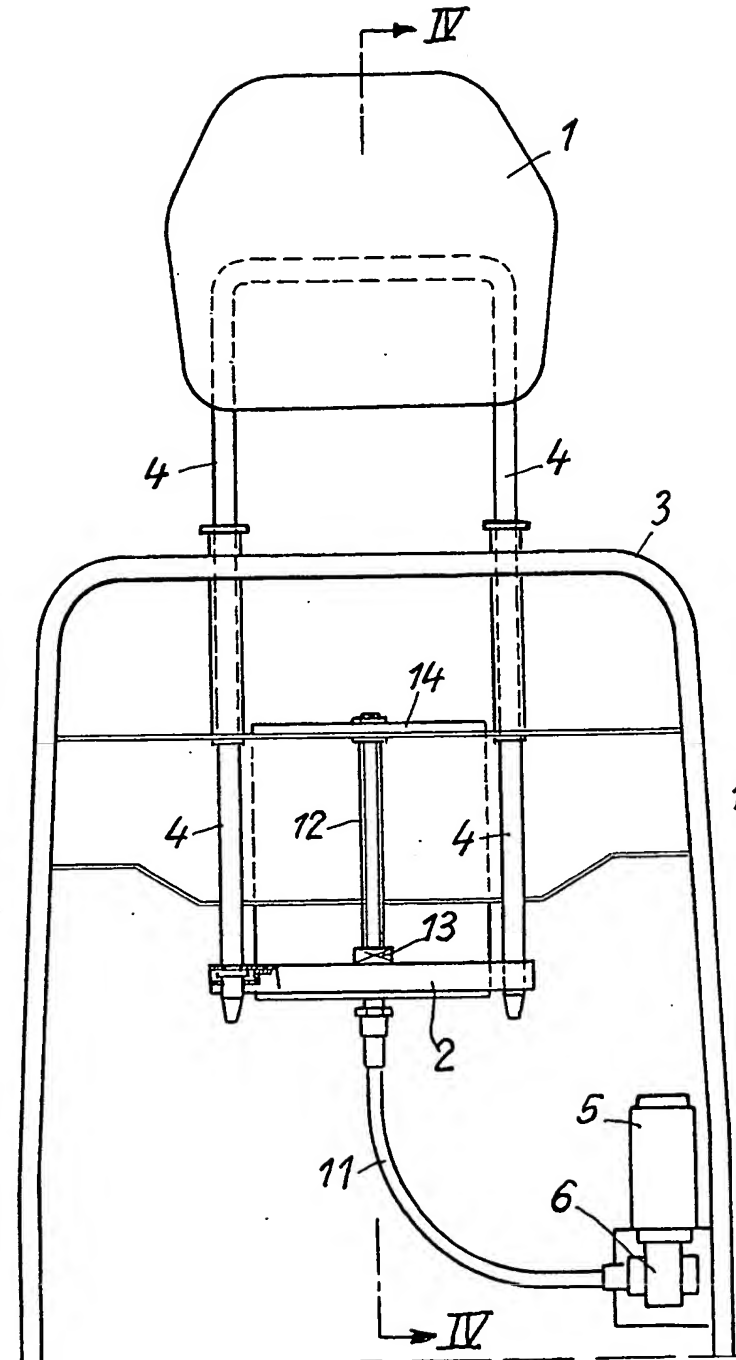


Fig.4

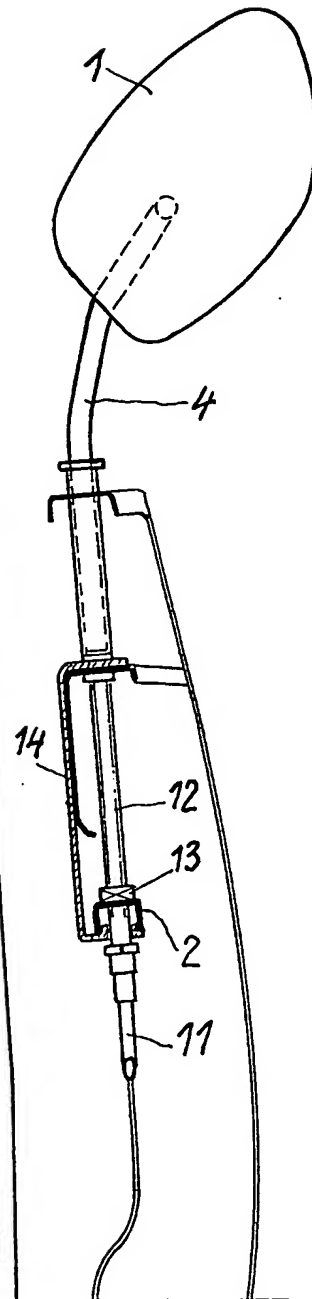


Fig. 5

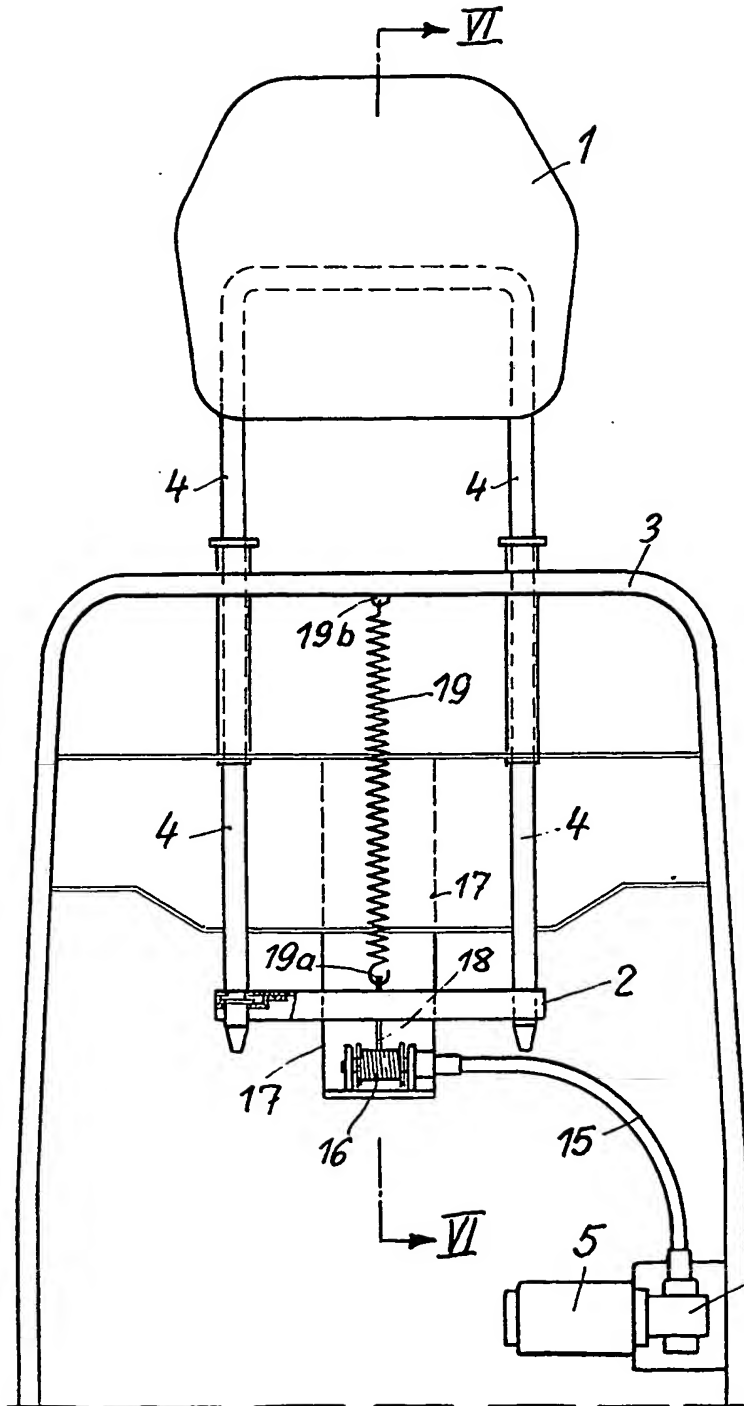
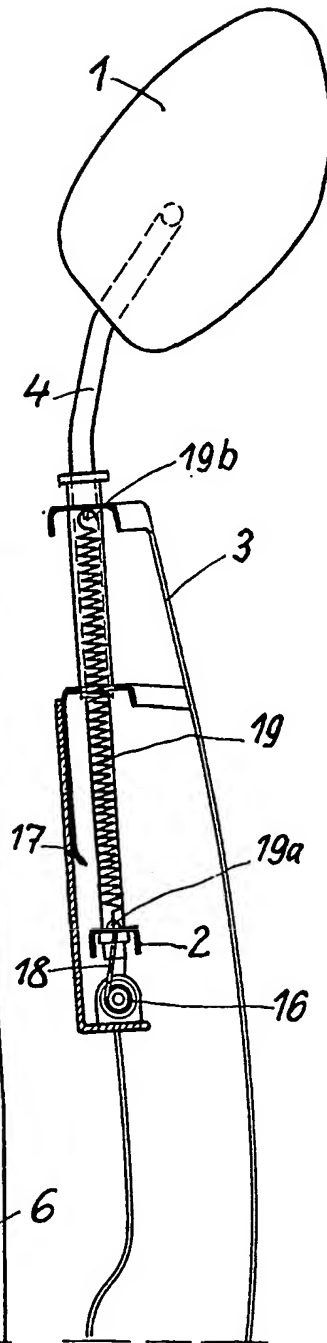


Fig. 6



## SPECIFICATION

## Adjustable headrest arrangement

5 This invention relates to an adjustable headrest arrangement.

Adjustable headrests for a vehicle seat usually have a cross-member arranged in the backrest frame. Mounting rods for the head rest are connected to the cross-member, and extend in a generally vertical direction. Vertical adjustment of the headrest is effected by hand, in that one grasps the headrest with both hands, and moves it upwards or downwards, according to requirements. This is disadvantageous in that the vehicle driver cannot adjust the headrest while driving. Also, the restricted conditions in a vehicle usually mean that adjustment of the headrest is extraordinarily difficult and time-consuming.

20 The invention aims to provide a generally improved adjustable headrest arrangement.

According to the present invention, there is provided an adjustable headrest arrangement comprising a headrest, a support adapted to be mounted in or form part of the frame of a seat back, at least one mounting member for the headrest, adjustment means for adjusting the position of said member relative to said support, and a power source for actuating said adjustment means.

30 In preferred embodiments of the invention, it is possible for the driver of a vehicle or craft to adjust his headrest even whilst driving.

In an expedient embodiment, the power source comprises a reversible electric motor, a flexible drive shaft connecting the motor and the adjustment means.

A cog rack may be provided, movable with the said mounting member, which rack is engaged by a pinion driven by the flexible drive shaft.

40 In an alternative embodiment, the flexible drive shaft may be connected to the spindle screw of a spindle drive, the nut of which is movable with the mounting member. The axis of the spindle is fixed relative to the said support.

45 In a further alternative embodiment, the flexible drive shaft may be connected to a cable winch, of which one end of the cable is connected to the mounting member, which in turn is resiliently biased in one direction, for example, by means of a spring.

50 For a better understanding of the invention, and to show how the same may be carried into effect, reference will be made, by way of example only, to the accompanying diagrammatic drawings, in which:

Figure 1 is a view of a first embodiment of an adjustable headrest in a vehicle seat;

Figure 2 is a vertical section on the line II-II of Figure 1;

Figure 3 is a view of a second embodiment of an adjustable headrest in a vehicle seat;

60 Figure 4 is a vertical section on the line IV-IV of Figure 3;

Figure 5 is a view of a third embodiment of an adjustable headrest in a vehicle seat; and

Figure 6 is a vertical section on the line VI-VI of Figure 5.

In the figures, like reference numerals denote like or corresponding parts.

70 In Figures 1 and 2, a cross-member 2 is arranged in the backrest frame 3 of the vehicle seat. Mounting members in the form of vertically-extending rods 4 are connected at one end to a cross-member 2, and at their opposite ends to the headrest 1. The rods 4 are guided in, and movable relative to, a support 20 which is mounted in, or part of, the frame 3.

75 The headrest 1 is adjustable by means of an electrically-driven adjustment means. A reversible electric motor 5 is provided as the electric drive, and is connected via a gear 6 to a flexible drive shaft 7.

80 As is shown in Figures 1 and 2, a cog rack 8 is attached to the cross-member 2, the connection between these two parts being effected via a ridge 9.

A fixed pinion 10 engages the cog rack 8, which pinion is connected to the flexible drive shaft 7, and is mounted on the support 20.

85 If the headrest 1 is to be vertically adjusted, the electric motor 5 is switched on, which sets the flexible shaft 7 and thus the pinion 10 into rotational motion. As a result of this, the cog rack 8, together with the cross-member 2, the rods 4 and the headrest 1 connected to the latter, move in the corresponding direction. When the desired height of adjustment has been reached, the electric motor 5 is switched off.

90 Movement of the headrest 1 in the opposite direction can be effected by reversing the rotational direction of the electric motor 5.

In the embodiment of Figures 3 and 4, a spindle screw 12 of a spindle drive 12, 13 is connected to a flexible drive shaft 11, whilst the nut 13 of the spindle drive is screwed to the cross-member 2. In order to fulfil the function of a spindle drive, the spindle screw 12 must be fixed in the axial direction. This is done by corresponding mounting in a support 13, which is connected in a suitable manner to the backrest frame 3.

105 If the electric motor 5 is switched on, the flexible shaft 11 transfers the rotational movement to the spindle screw 12 of the spindle drive 12, 13. In this way, the cross-member 2, the two rods 4 connected thereto, and the headrest 1 are raised or lowered according to the respective rotational direction of the electric motor 5. By switching off the electric motor 5, the adjustment means will be stopped in the desired position.

110 In the embodiment of Figures 5 and 6, a flexible drive shaft 15 is connected to a cable winch 16, which is mounted on a support 17 attached to the backrest frame 3. One end of the winch cable 18 is secured to the cross-member 2, which is resiliently biased in one direction by a return spring 19. One end 19a of the return spring 19 is hinged to the cross-member 2, whilst the other end 19b is connected in a suitable manner to the backrest frame 3.

125 If the headrest 1 is to be lowered, i.e. moved downwards in Figure 5, then the electric motor 5 is switched on in such a way that the cable end 18 is wound onto the cable winch 16. The traction exerted on the cross-member 2 results in a downward movement of the headrest 1. During this downward movement of the headrest 1, the return spring 19 is

tensioned.

If the headrest is to be raised again, the electric motor 5 is switched in such a way that its rotational direction is reversed. As a result of this, the cable end 18 unwinds itself from the cable winch 16, whilst the tension of the relaxing return spring 19 moves the cross-member 2 and thus the connected rods 4 and the headrest 1 upwards.

The illustrated arrangements may be adapted to provide headrest adjustment in other directions, and a power source other than an electric motor may be employed. Any convenient number of mounting members for the headrest may be employed. Instead of the flexible drive shafts, direct drives (e.g. of the spindle 12, Figure 3) may be used.

#### CLAIMS

1. An adjustable headrest arrangement comprising a headrest, a support adapted to be mounted in or form part of a seat back, at least one mounting member for the headrest, adjustment means for adjusting the position of said member relative to said support, and a power source for actuating said adjustment means.
2. A headrest according to claim 1, wherein said mounting member is adapted to move upwardly and downwardly in use.
3. A headrest according to claim 1 or 2, wherein said power source comprises a reversible motor and said adjustment means is connected thereto by a flexible drive shaft.
4. A headrest according to claim 3, wherein said motor is an electric motor.
5. A headrest according to any of claims 1 to 4, wherein said adjustment means comprises a rack movable with said mounting member, and a pinion which engages said rack and is arranged to be driven by said power source, the axis of said pinion being fixed relative to said support.
6. A headrest according to any of claims 1 to 4, wherein said adjustment means comprises a nut movable with said mounting member, and a spindle which screw-threadedly engages said nut and is arranged to be rotatably driven by said power source, the axis of said spindle being fixed relative to said support.
7. A headrest according to any of claims 1 to 4, wherein said adjustment means comprises a winch which is fixed relative to said support and is arranged to be driven by said power source, a cable which is connected to said mounting member and is arranged to be wound on said winch to move said mounting member in one direction, and resilient bias means for moving said mounting member in an opposite direction.
8. A headrest according to any preceding claim, comprising a plurality of said mounting members mounted on a common cross-member.
9. An adjustable headrest arrangement, substantially as hereinbefore described with reference to Figures 1 and 2, Figures 3 and 4, or Figures 5 and 6, of the accompanying drawings.
10. A seat provided with a headrest according to any preceding claim.
11. A seat according to claim 10 as appendant to claims 7 and 8, wherein said resilient bias means

comprises a spring, one end of which is connected to said support or said frame, and the other end of which is connected to said cross-member.

12. A seat according to claim 10 or 11, adapted for use in a vehicle or craft.

13. A vehicle or craft having a seat according to claim 12.

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